

BXP-A101 Series Hardware User Manual

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BCP-A101 Series Hardware User Manual

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1. Introduction

The BXP-A101 wall-mount computers are powered by an Intel Atom® X processor. The computers come with a rich set of interface options including two software-selectable RS-232/422/485 serial ports, two gigabit Ethernet ports, four digital inputs, and four digital outputs. The communication interfaces are located on the front side of the product, enabling easy access and expansion for industrial applications. A dual-storage design that includes CFast and SD slots enables easy storage expansion. The unique battery fastener cover design for the battery slot secures the battery in place and ensures stability in all operating environments.

Package Checklist

Each model is shipped with the following items:

- BXP-A101 Series computer
- 2-pin terminal block for DC power input
- 2-pin terminal block for connecting a power button extension
- 10-pin terminal block for DIOs
- Quick installation guide (printed)
- Warranty card



NOTE

Notify your sales representative if any of the above items are missing or damaged.

Product Features

BXP-A101 computers include the following features:

- Box-type computer with fanless design
- Intel Atom® X Series processor
- Compact size to fit most field applications
- -30 to 70°C operating temperature range
- External dual storage with a removable cover design for easy maintenance

Hardware Specifications



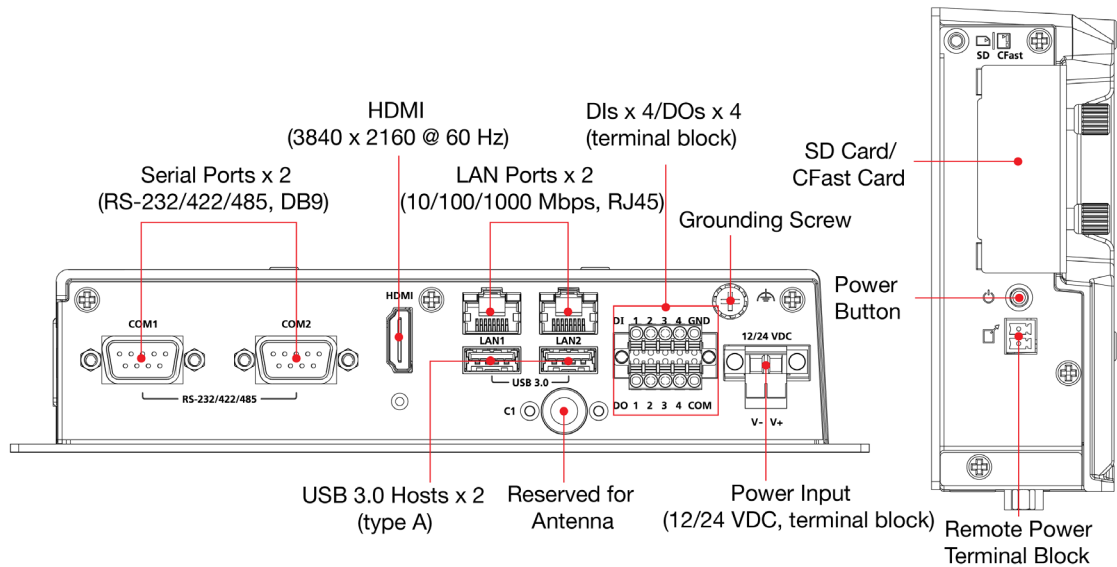
NOTE

The latest specifications for Moxa's products can be found at <https://moxa.com>.

2. Hardware Introduction

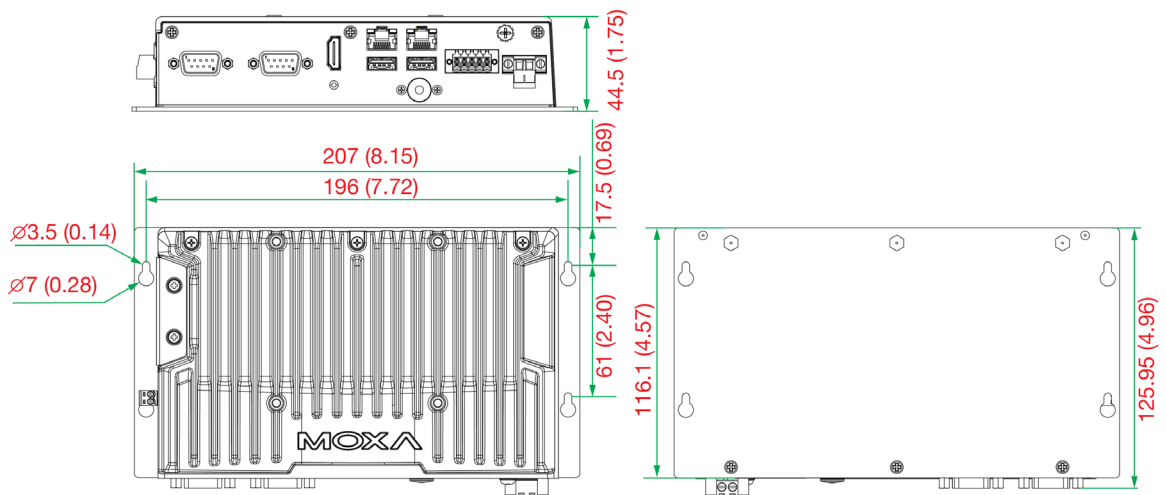
The BXP-A101 computers are compact, well-designed, and rugged enough for industrial applications. LED indicators help you monitor performance and troubleshoot issues, multiple serial ports allow you to connect different devices, and the reliable and stable hardware platform lets you devote your attention to developing your applications.

Appearance



Dimensions

Unit: mm (inch)



LED Indicators

The following table describes the LED indicators located on the front panel of BXP-A101 computers.

LED Name	LED Color	LED Function
Power	Green	Power is on (S5 state)
	Off	Power is off and the device is in S5 state
Ethernet (10/100 Mbps) (1000 Mbps)	Green	Steady on: 10/100 Mbps Ethernet link Blinking: Data is being transmitted or received
	Yellow	Steady on: 1000 Mbps Ethernet link Blinking: Data is being transmitted or received
	Off	No Ethernet connection

Real-time Clock (RTC)

The BXP-A101's real-time clock is powered by a lithium battery. You can easily replace the battery yourself using an optional battery kit. However, please note that there is a risk of explosion if the battery is replaced by an incorrect type of battery. Contact a qualified Moxa support engineer if you have any questions about the RTC battery.



ATTENTION

There is a risk of explosion if the battery is replaced by a battery of the incorrect type.

3. Hardware Connection Description

In this chapter, we describe how to connect the BXP-A101 to the network and to various devices.

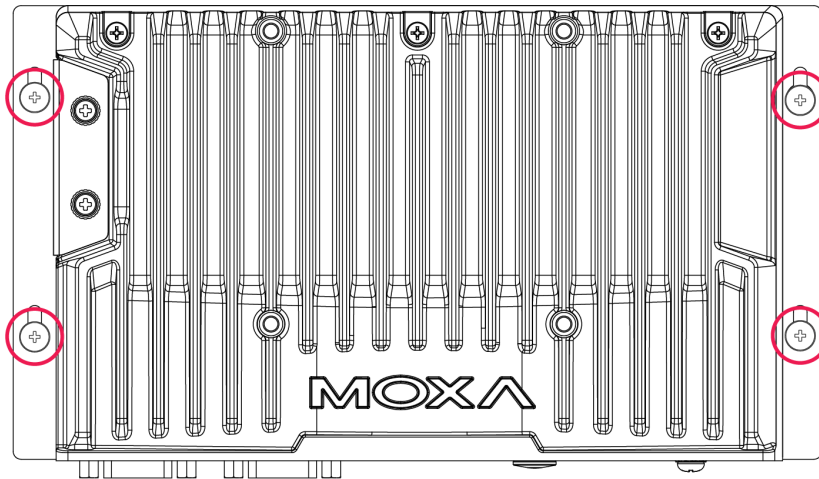
Mounting the BXP-A101

The BXP-A101 computer comes with a wall-mounting plate attached to the rear side of the device by default. To mount the BXP computer to a wall or cabinet, use two screws on each side as shown in the illustration.



NOTE

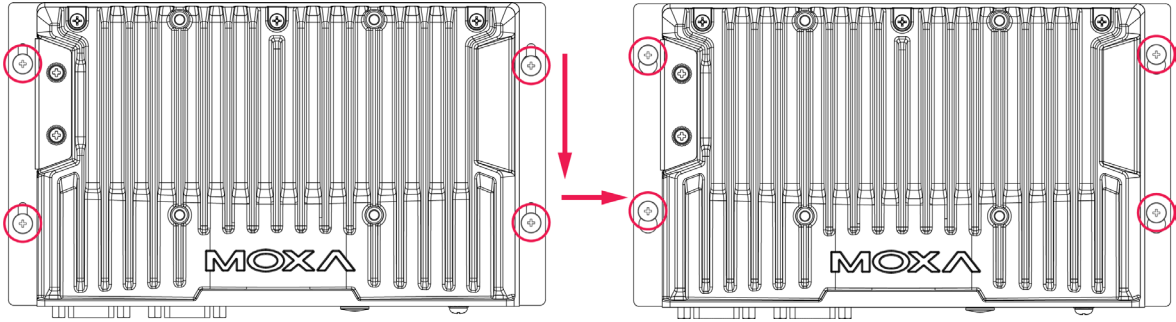
The four screws for attaching the computer to the wall or cabinet are NOT included in the product package; they need to be purchased separately.



The four screws to mount the BXP computer to a wall are not included in the product package. You need to purchase them separately. Refer to the illustration for the screw dimensions.



Push the computer downwards to ensure that the device is securely fixed to the mounting surface.



NOTE

This computer is intended to be installed only in an area with restricted access. In addition, for safety reasons, the computer should be installed and handled only by qualified and experienced professionals.



ATTENTION

Safety First!

Be sure to disconnect the power cord before installing and/or wiring your BXP-A101.

Wiring Caution!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size. If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

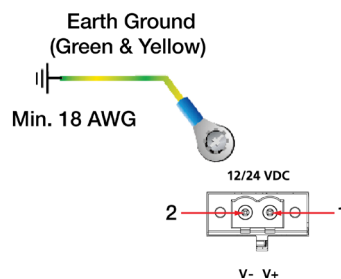
Temperature Caution!

Be careful when handling the unit. When the unit is plugged in, the internal components generate heat, and consequently the outer casing may feel hot to the touch.

Connecting the Power

The BXP-A101 computer is provided with 2-pin power input connectors in a terminal block on the front panel. Insert the power-cord wires into the connectors and tighten them to secure the wires in place. Push the power button. The power LED will light up to indicate that power is being supplied to the computer. It should take about 30 to 60 seconds for the operating system to complete the boot-up process.

Pin	Definition
1	V+
2	V-



The power input specification is as follows:

- The DC power source rating is 12 VDC @ 3.4 A or 24 VDC @ 1.7 A
- The wire used should be a minimum of 18 AWG

For surge protection, connect the grounding connector located below the power connector with the earth (ground) or a metal surface.



NOTE

This computer is intended to be supplied by a UL Listed Power Unit "LPS" (or "Limited Power Source") rated 12 V @ 3.4 A min. or 24 V @ 1.7 A min., and minimum Tma = 70°C. If you need assistance with purchasing a power adapter, contact the Moxa technical support team.



NOTE

If using Class I adapter, the power cord adapter should be connected to a socket outlet with an earthing connection or the power cord and adapter must comply with Class II construction.



ATTENTION

Before connecting the BXP-A101 computer to a DC power input, make sure the DC power source voltage is stable.

- The wiring for the input terminal block shall be installed by a skilled person.
- Wire type: Cu
- Only use 18-12 AWG wire size and a torque value of 0.5 N-m.
- Use only one conductor in a clamping point between the DC power source and the power input.



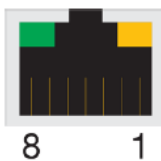
警告

為避免電磁干擾，本產品不應安裝或使用於住宅環境。

Communication Connections

Connecting to the Network

The BXP-A101 computer has two 10/100/1000 Mbps Ethernet ports with RJ45 connectors on the front panel. For the pin assignments, refer to the following table:



Pin	10/100 Mbps	1000 Mbps
1	ETx+	TRD(0)+
2	ETx-	TRD(0)-
3	ERx+	TRD(1)+
4	-	TRD(2)+
5	-	TRD(2)-
6	ERx-	TRD(1)-
7	-	TRD(3)+
8	-	TRD(3)-



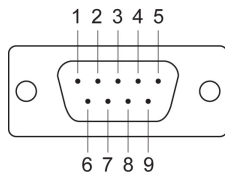
NOTE

For reliable Ethernet connections, we recommend enabling ports at standard temperatures and keeping them enabled in high/low temperature environments.

Connecting to a Serial Device

The BXP-A101 computer comes with 2 software-selectable RS-232/422/485 serial ports on the front panel. The ports use DB9 male connectors.

DB9 Male Port



RS-232/422/485 Pinouts

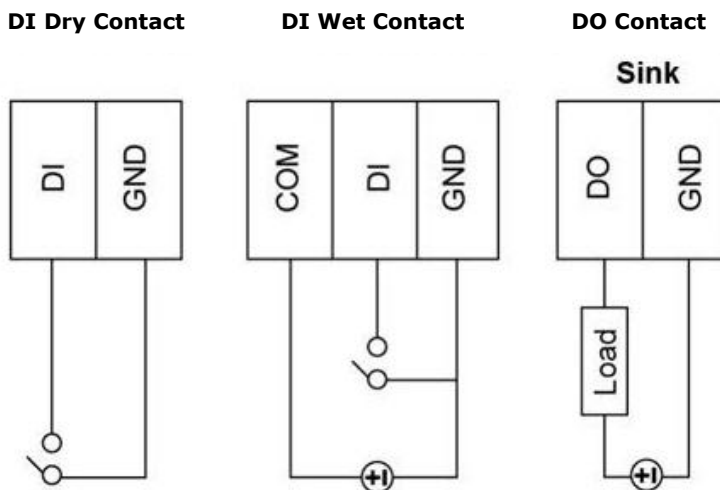
Pin	RS-232	RS-422	RS-485 (4-wire)	RS-485 (2-wire)
1	DCD	TxDA(-)	TxDA(-)	-
2	RxD	TxDB(+)	TxDB(+)	-
3	TxD	RxDB(+)	RxDB(+)	DataB(+)
4	DTR	RxDA(-)	RxDA(-)	DataA(-)
5	GND	GND	GND	GND
6	DSR	-	-	-
7	RTS	-	-	-
8	CTS	-	-	-

Digital Inputs/Digital Outputs

The BXP-A101 comes with four digital inputs and four digital outputs in a terminal block. The pin definitions and current ratings are listed in the following table:

DI 1 2 3 4 GND	Digital Inputs	Digital Outputs
	Dry Contact: Logic 0: Close to Ground Logic 1: Open	Current Rating: 200 mA per channel
	Wet Contact: Logic 0: +10 V to +30 V (Source to DI) Logic 1: +3 V max. (Source to DI)	Voltage: 0 to 24 VDC (typ.), 30 V (max.)
DO 1 2 3 4 GND		

The wiring method is illustrated in the following diagram:



Connecting Displays

The BXP-A101 Series computer comes with an HDMI display output located on the front panel.



NOTE

Use HDMI-certified cables for a reliable audio or video connection.

Connecting USB Devices

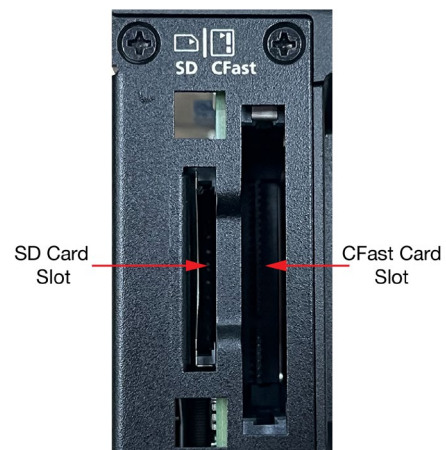
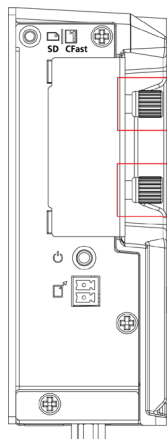
The BXP-A101 Series computer comes with 2 USB 3.0 ports on the front panel. The USB ports can be used to connect to peripherals, such as keyboard, mouse, or flash drives for expanding the system's storage capacity.

Installing a SD/CFast Card

The BXP-A101 computer comes with two slots for plugging in an SD card and a CFast card.

To plug in the cards, do the following:

1. Remove the two screws that secure the slot cover.
2. Remove the cover and locate the SD and CFast card slots.



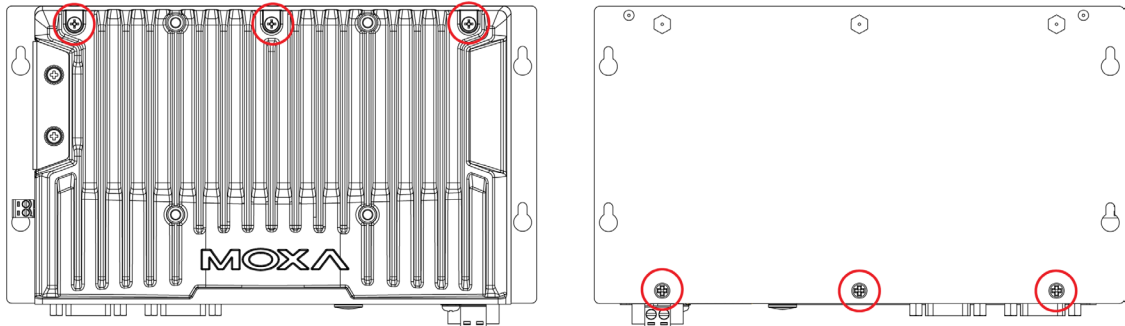
3. Insert the SD and CFast cards in the designated slots. Refer to the image printed beside the slots for the correct direction to insert the cards. When the cards are successfully inserted, you will hear a click.
4. To remove the cards, simply push them in to release them and take them out.
5. Replace the cover and fasten the two screws.

Installing the Mini PCIe Card

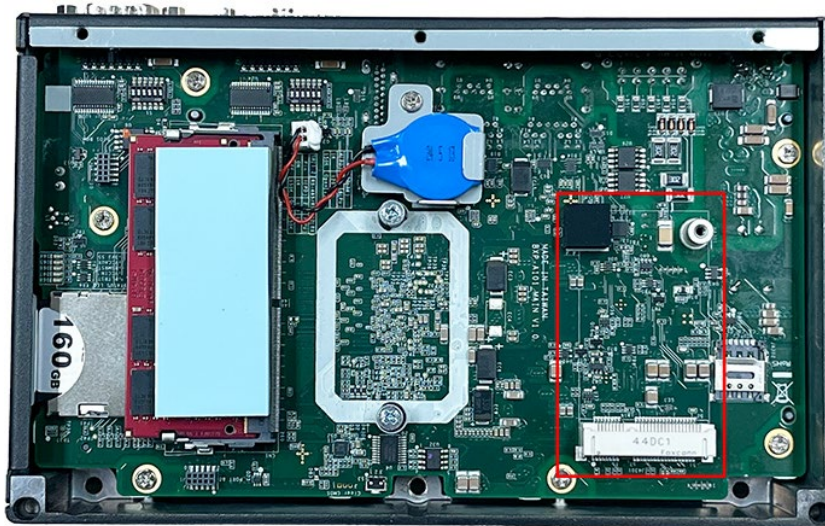
The BXP-A101 Series computers come with one Mini PCIe socket.

To install a Mini PCIe card, do the following:

1. Unfasten the three screws on the top panel, and another three screws on the rear panel.



2. Remove the rear cover of the computer to expose the socket.
The location of the Mini PCIe socket is indicated in the following figure:



3. Install the Mini PCIe module in the socket.



NOTE

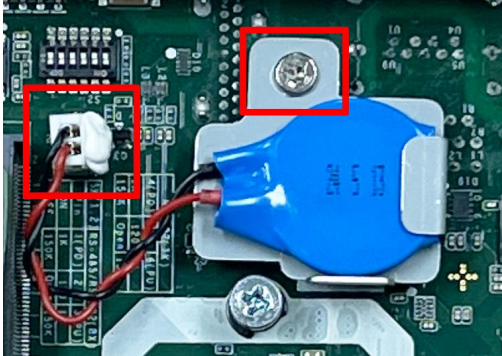
The Mini PCIe module is not included in the product package, you need to purchase it separately.

Replacing the RTC Battery

The BXP-A101 computer comes with one slot for an RTC battery inside the computer. A lithium battery (3 V / 200 mAh) is preinstalled in the slot.

To replace the battery, do the following:

1. Unfasten the screw and remove the connector of the battery.
2. Replace the battery with a new one, attach the connector back, and fasten the screw.



WARNING

You must purchase the battery from Moxa. Contact the Moxa Technical Support team before replacing the battery.

To reduce the risk of fire or burns, do not disassemble, crush, or puncture the battery; do not dispose of in fire or water and do not short external contacts. Dispose of used batteries according to the instructions on the battery.



警告

警告更換不正確之電池形式會有爆炸的風險，請依製造商說明書處理用過之電池。

4. BIOS Setup

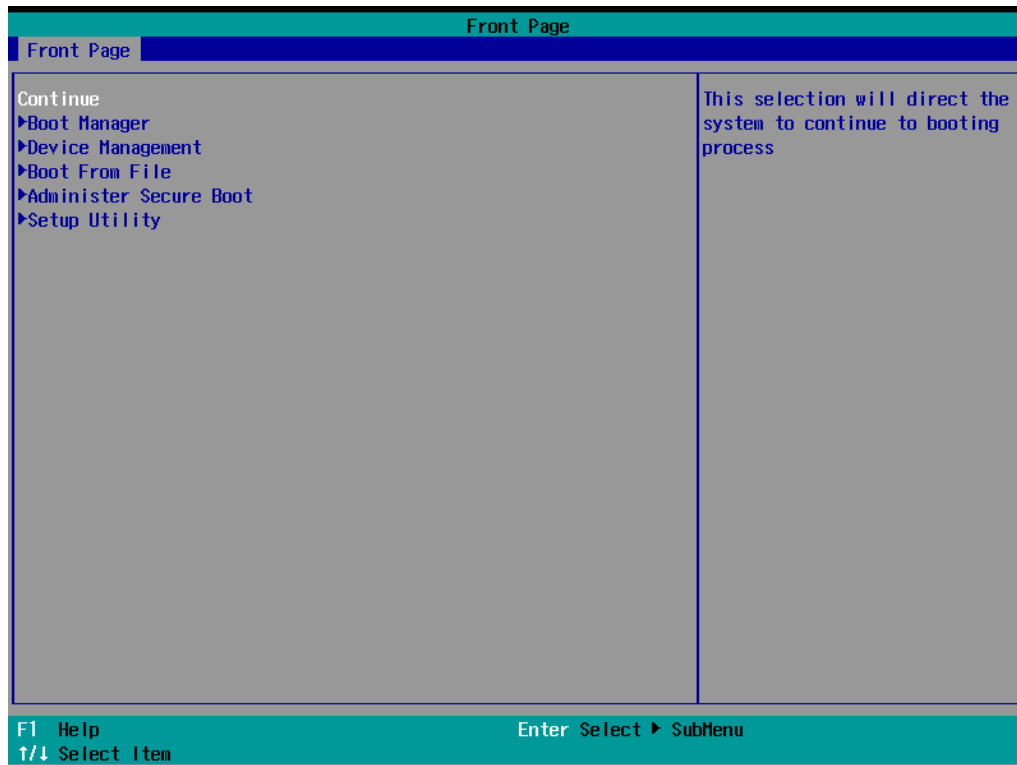
In this chapter, we describe the BIOS settings for the BXP-A101 computer. The BIOS is a set of input/output control routines for peripherals to initialize the basic settings. The BIOS helps boot the system before the operating system is loaded. The BIOS setup allows the user to modify the system configuration for basic input/output peripherals. All the configurations are stored in the CMOS RAM, which has a backup battery in case the computer is not connected to a power source. Consequently, the data stored in the CMOS RAM is retained when the system is rebooted, or the power is disconnected.

Entering the BIOS Setup

To enter the BIOS setup utility, press the F2 key while the system is booting up. The main BIOS Setup screen will appear. You can configure the following settings on this screen.

- **Continue:** Continue to boot up
- **Boot Manager:** Select the device for boot up
- **Device Management:** Enter the device configuration menu
- **Boot From File:** Select the UEFI boot up file
- **Administer Secure Boot:** Enter the Secure Boot menu
- **Setup Utility:** Enter the BIOS configuration menu

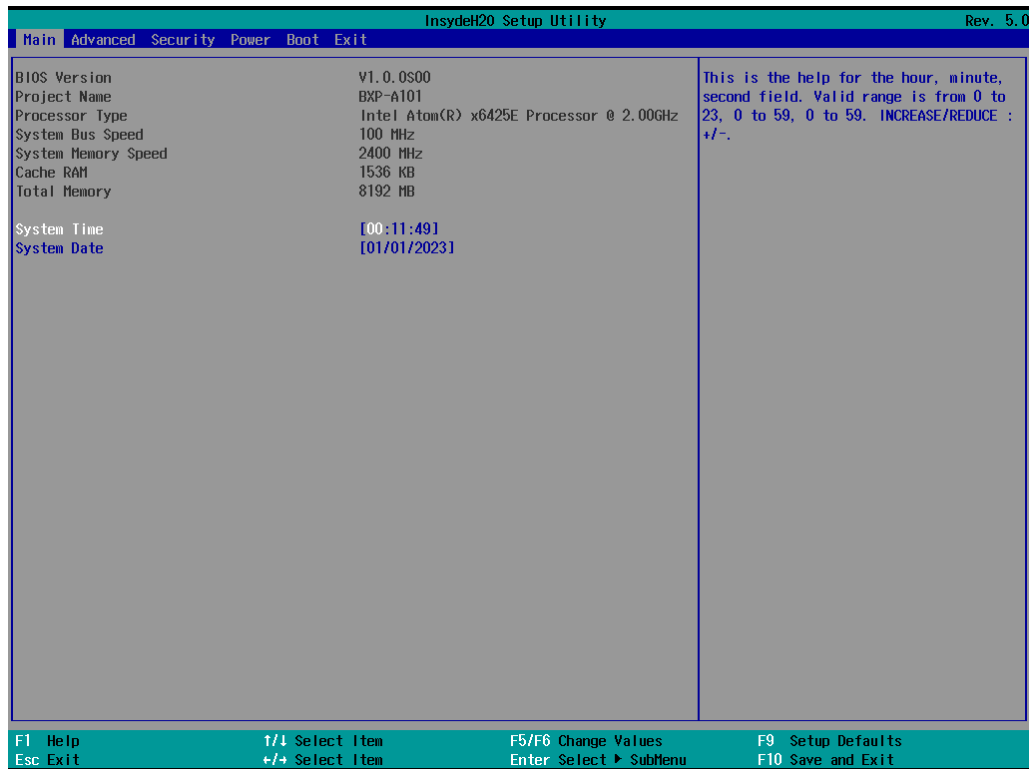
Select **F2** to enter the **BIOS configuration**.



When you enter the **Setup Utility**, a basic description of each function key is listed at the bottom of the screen. Refer to these descriptions to learn how to use them.

F1	General Help	↑ ↓ .	Select Item
F5/ F6	Change Values	← →	Select Menu
F9	Setup Defaults	ESC	Exit
F10	Save and Exit	ENTER	Select or go to Submenu.

The BIOS configuration screen will be shown when you enter the **Setup Utility** option.

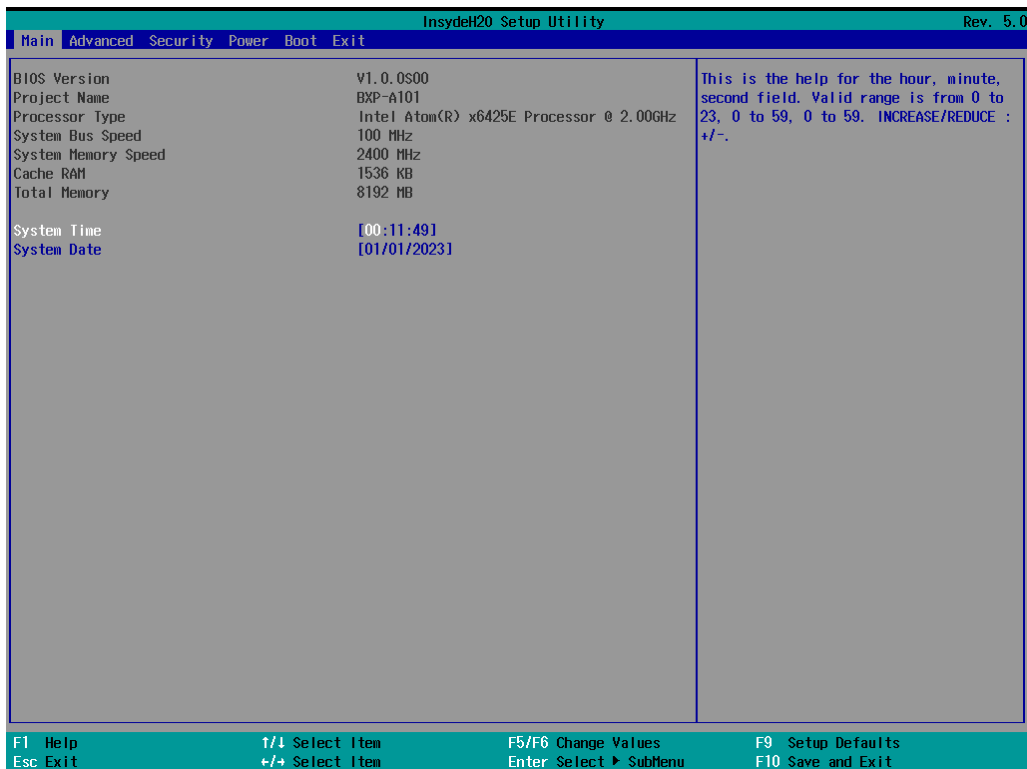


NOTE

The **Processor Type** information may vary depending on the model that you have purchased.

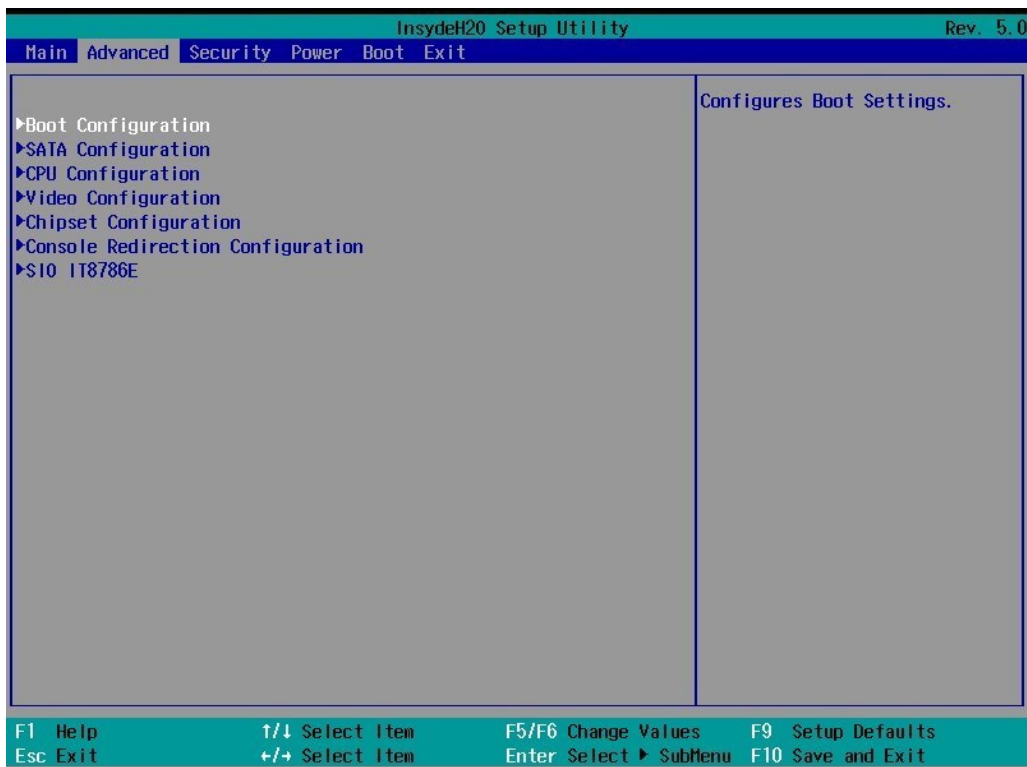
Main Page

The **Main** page displays basic hardware information, such as model name, BIOS version, and CPU type.



Advanced Settings

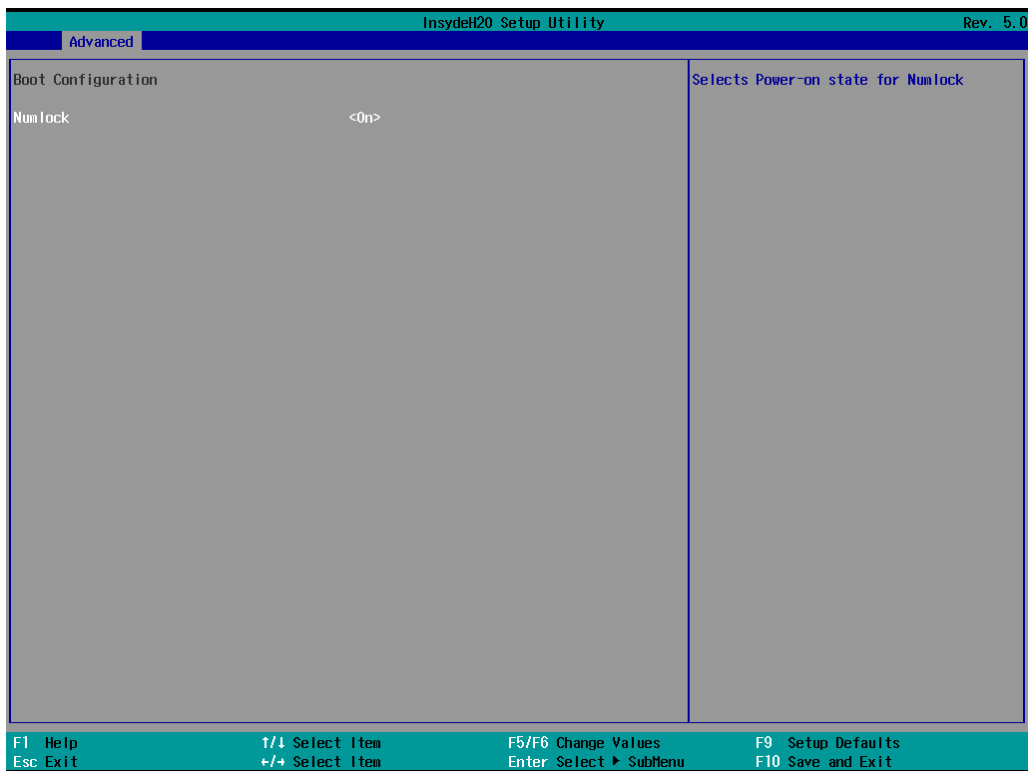
Select the **Advanced** tab in the main menu to open the advanced features screen.



Boot Configuration

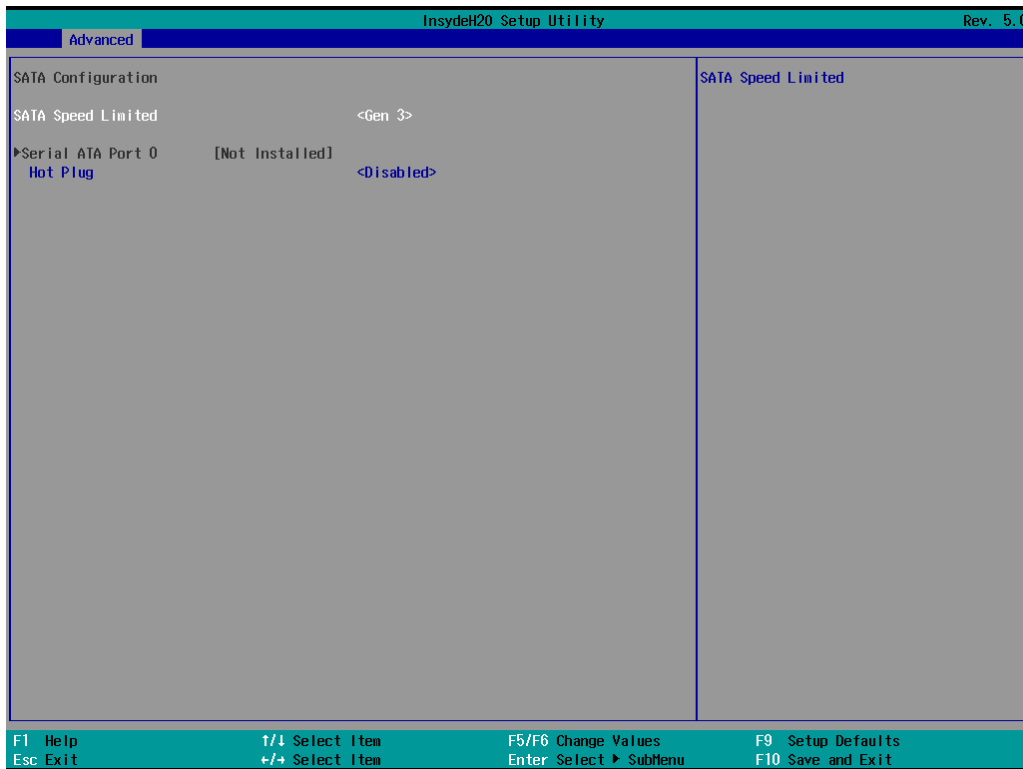
The **Numlock** option allows configuration of the Numlock value

Options: On (default), Off.



SATA Configuration

This section allows you to select the SATA speed limit and hot plug setting.



SATA Speed Limited

Options: Gen 1, Gen 2, Gen 3 (default)

Serial ATA Port

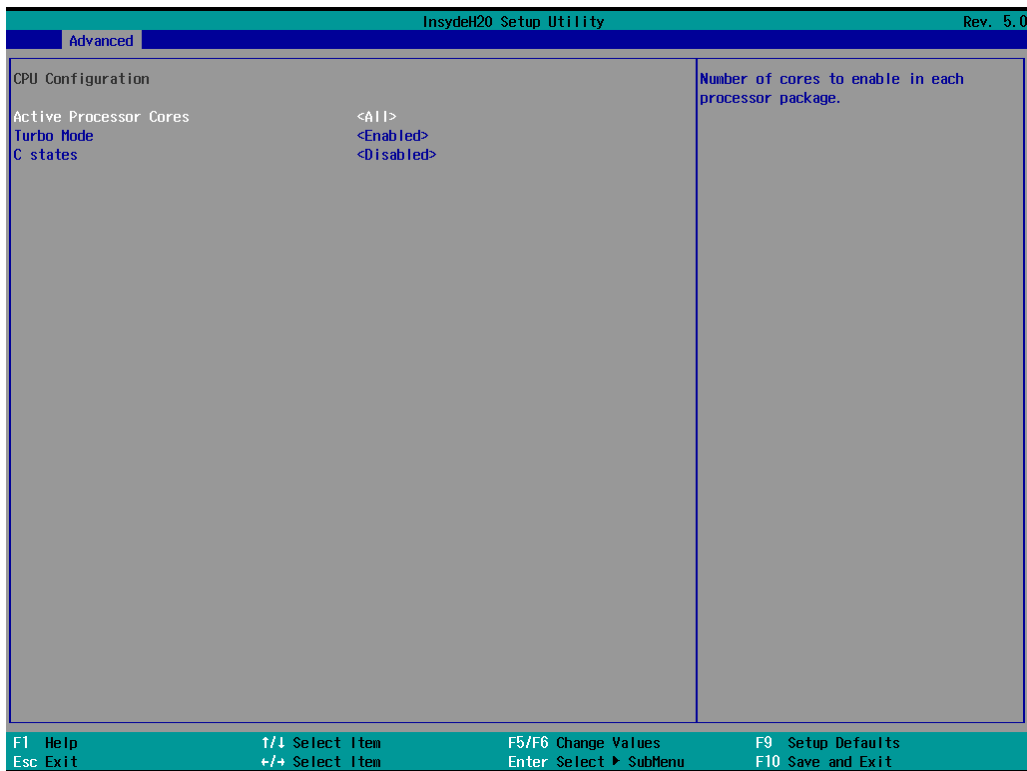
This setting displays information on the installed drives.

ATA Port Hot Plug

This setting allows you to enable/disable hot-plugging capabilities (the ability to remove the drive while the computer is running) that are configured by software for installed storage drives.

Options: Disabled (default), Enabled

CPU Configuration



Active Processor Cores

This item indicates the number of cores to enable in each processor package (Cores number depended on the processor).

Options: All (default), 1, 2, 3

Turbo Mode

Enable/Disable processor Turbo Mode (not supported in models with Intel® Celeron®).

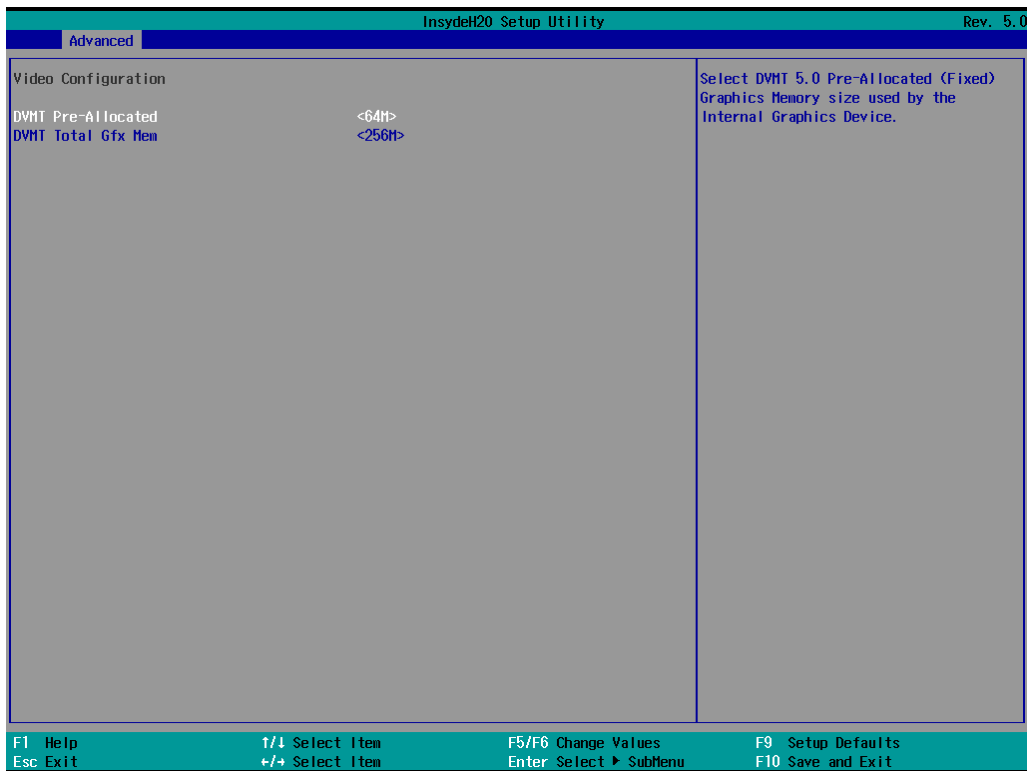
Options: Disabled, Enabled (default)

C states

This item can Enable/Disable CPU power Management. Allows CPU to go to C states when it's not 100% utilized.

Options: Disabled (default), Enabled

Video Configuration



DVMT Pre-Allocated

This item allows you to configure pre-allocated memory capacity for the IGD. Pre-allocated graphics memory is invisible to the operating system.

Options: 64M (default), 96M, 128M, 160M

DVMT: The amount of video memory your computer has is dependent on the amount of pre-allocated memory set for your system plus the Dynamic Video Memory Technology (DVMT). DVMT dynamically allocates system memory for use as video memory creating the most efficient use of available resources for maximum 2D/3D graphics performance.

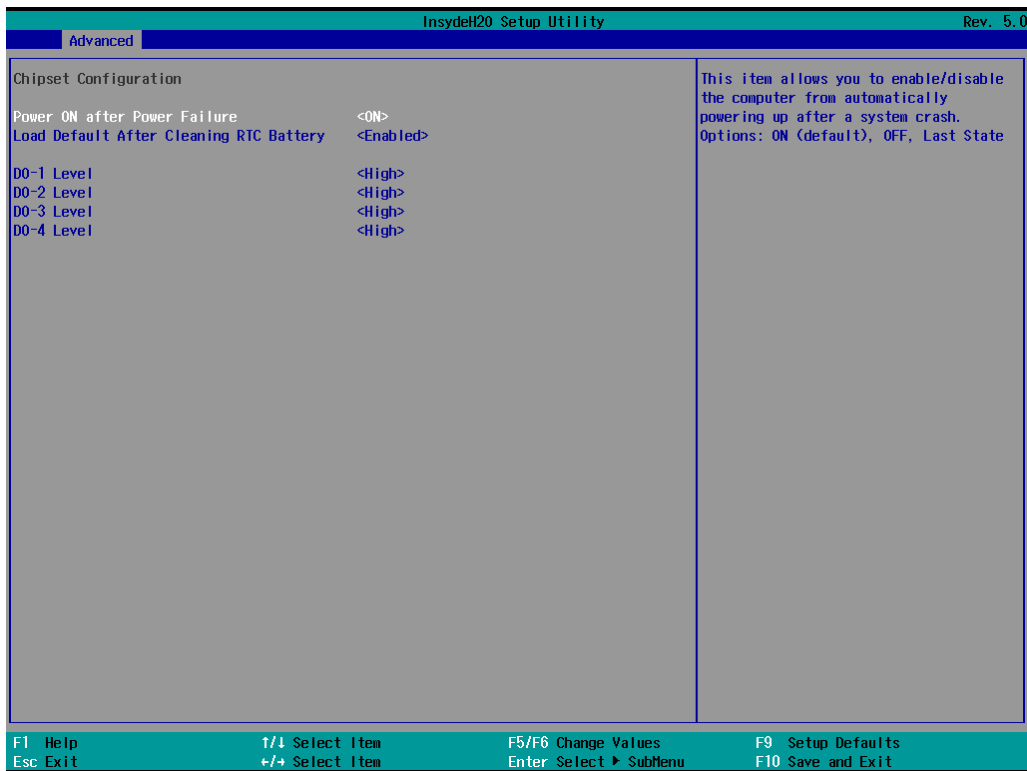
DVMT Total Gfx Mem.

This item allows you to configure the maximum amount of memory DVMT will use when allocating additional memory for the internal graphics device.

Options: 256 MB (default), 128 MB, Max.

Chipset Configuration

This section allows you to configure the chipset settings.



Power ON after Power Failure

This item allows you to enable/disable the computer from automatically powering up after system power is re-enabled.

Options: ON (default), OFF, Last State

Load Default After Cleaning RTC Battery

System will load default when detecting RTC battery loss.

Options: Disabled, Enabled (default)

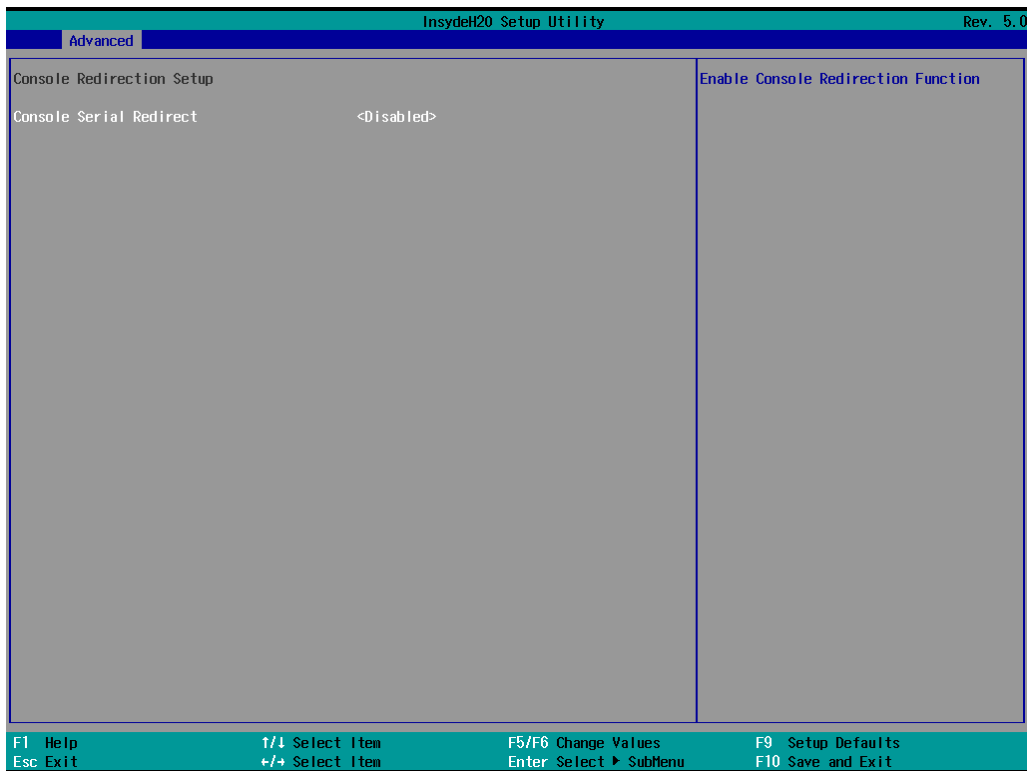
DO-X Level

This item allows users to set the DO to high or low.

Options: High (default), Low

Console Redirection

This section allows you to configure the console redirection settings.



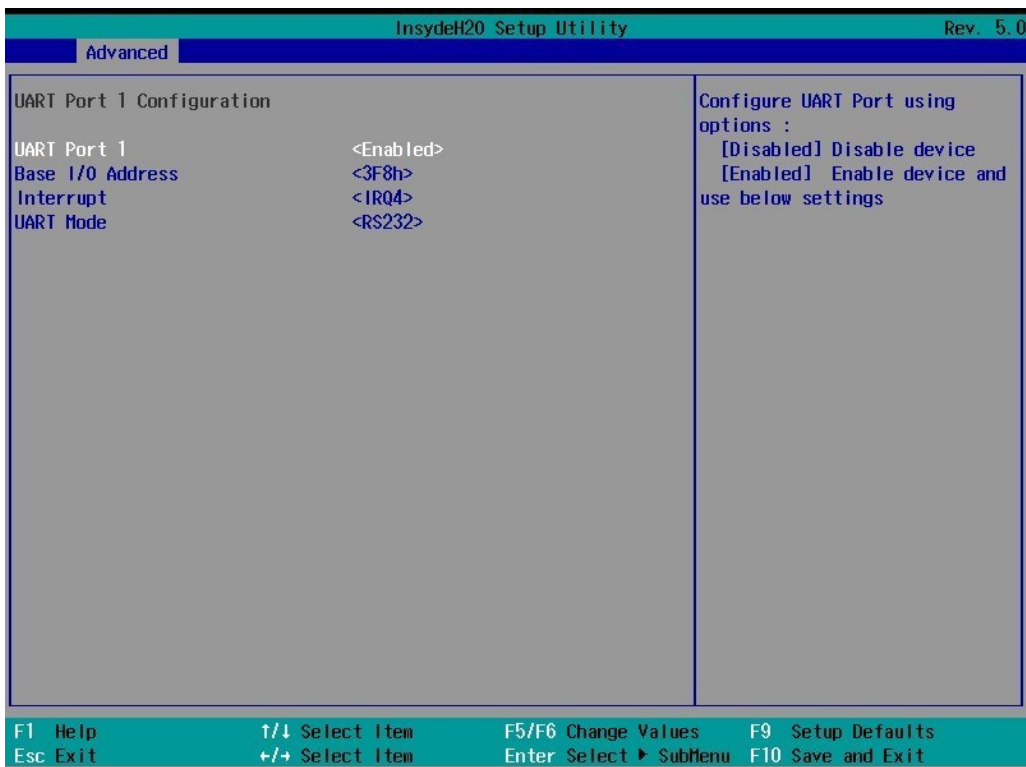
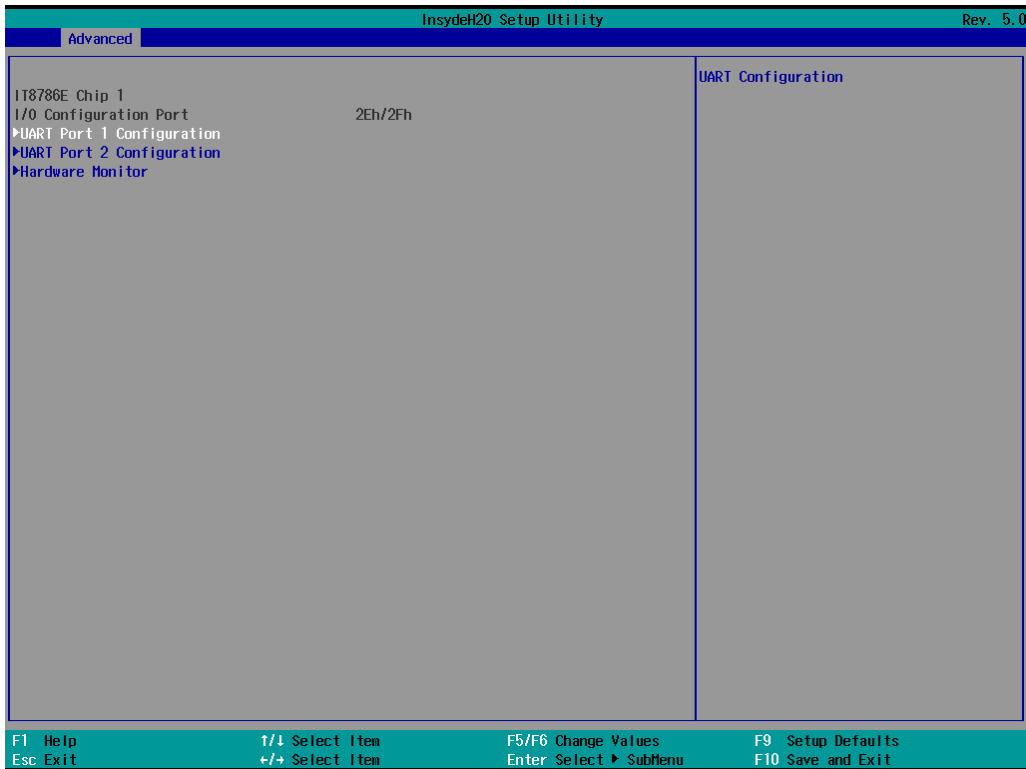
Console Serial Redirect

When the Console Redirection Function is enabled, the console information will be sent both to the display monitor and the serial port (COM1).

Options: Disabled (default), Enabled

SIO ITE8786E

This section allows users to configure SIO settings.



UART Port 1

This function allows users to configure the resources for the UART port 1.

Disable: Disable the UART port 1 connection

Enable: Enable the UART port 1 connection (default)

UART Port 2

This function allows users to configure the resources for the UART port 2.

Disable: Disable the UART port 2 connection

Enable: Enable the UART port 2 connection (default)



NOTE

All other UART ports can only be configured by an OS utility.

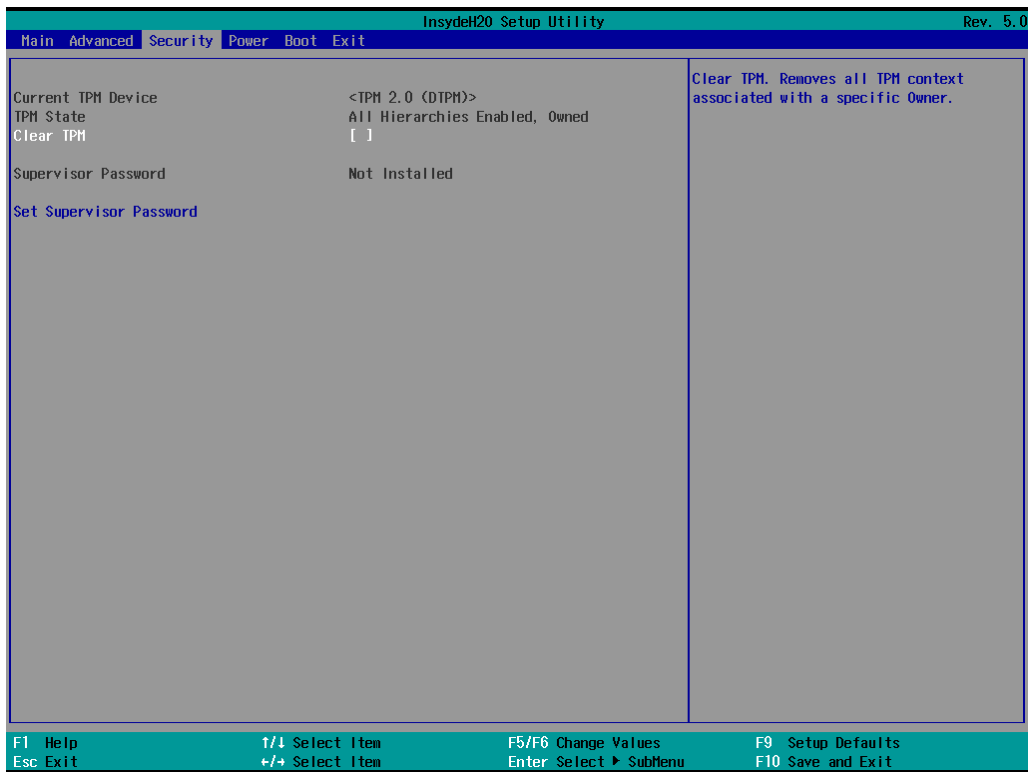
Hardware Monitor

This section allows you to view stats such as CPU and system temperature, voltage levels, and other chipset information.

InsydeH20 Setup Utility		Rev. 5.0
Advanced		
Hardware Monitor		
Voltage		
3.3V	3.278 V	
5V	5.123 V	
Temperature		
System (°C/°F)	49.0 °C/ 120.2 °F	
System2 (°C/°F)	38.0 °C/ 100.4 °F	
CPU (°C/°F)	43.0 °C/ 109.4 °F	
F1 Help	↑/↓ Select Item	F5/F6 Change Values
Esc Exit	+/- Select Item	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

Security Settings

This section allows users to configure security-related settings with a supervisor password.



Current TPM Device

This item shows if the system has TPM device and its type.

TPM State

This item allows you view the status of current TPM settings.

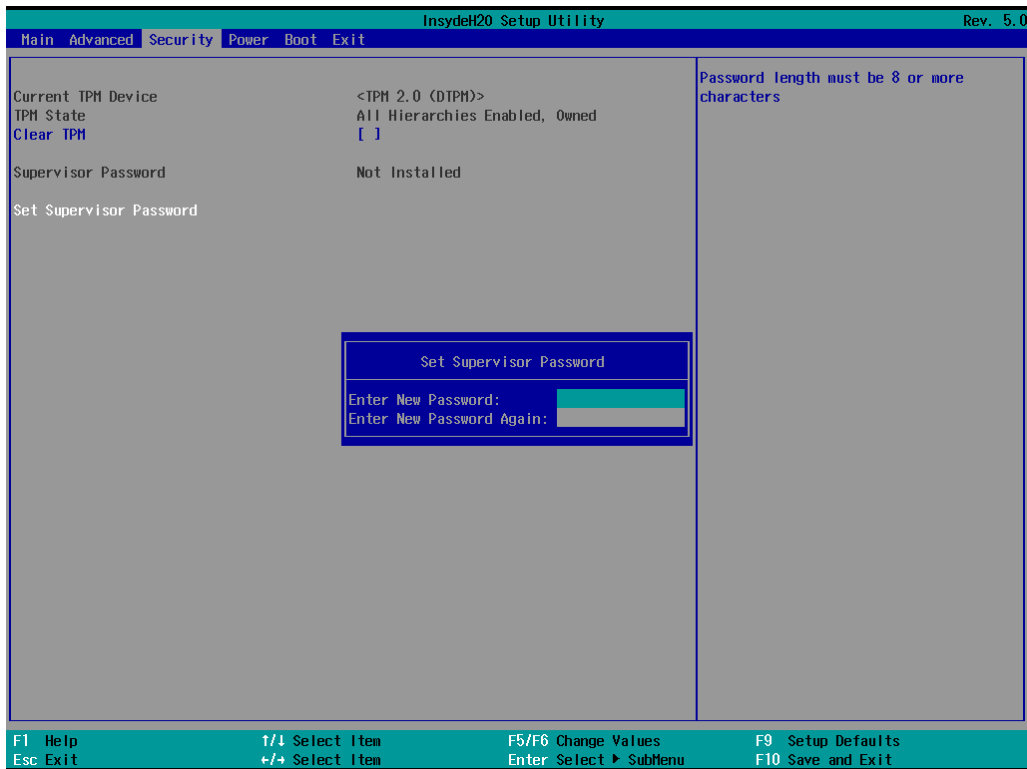
Clear TPM

This item allows users to remove all TPM context associated with a specific owner.

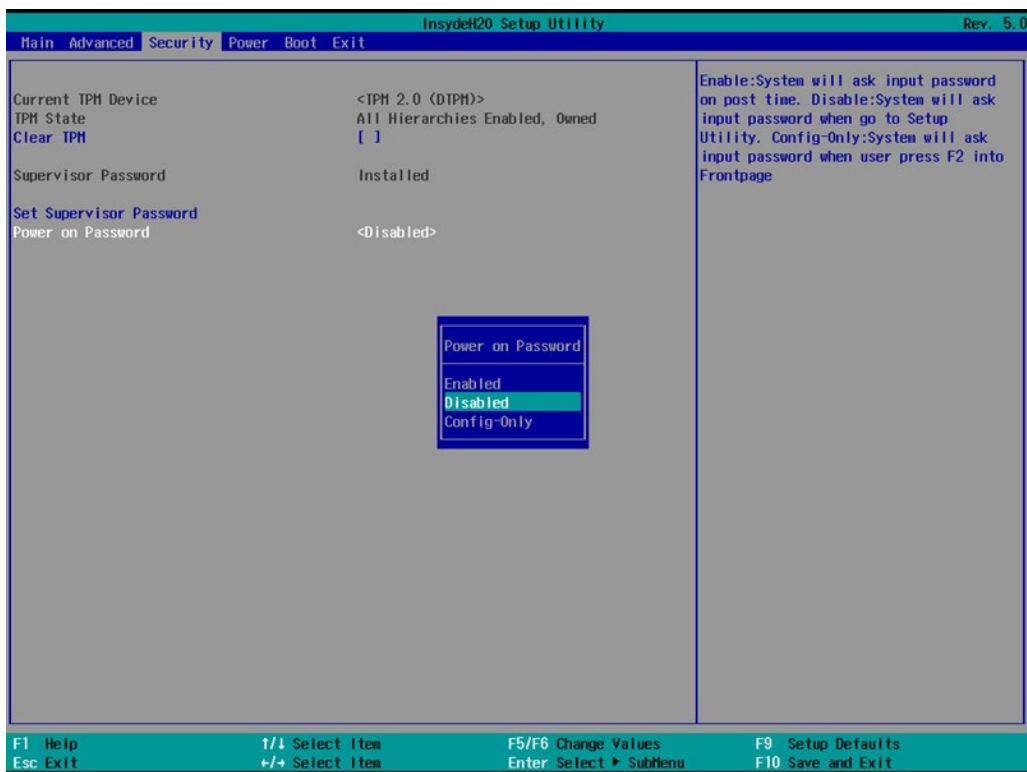
Set Supervisor Password

This item allows you to set the supervisor password. Select the **Set Supervisor Password** option and enter the password and confirm the password again.

To delete the password, select the **Set Supervisor Password** option and enter the old password; leave the new password fields blank, and then press enter.



After setting the supervisor password, users can choose when the input password screen should be displayed.



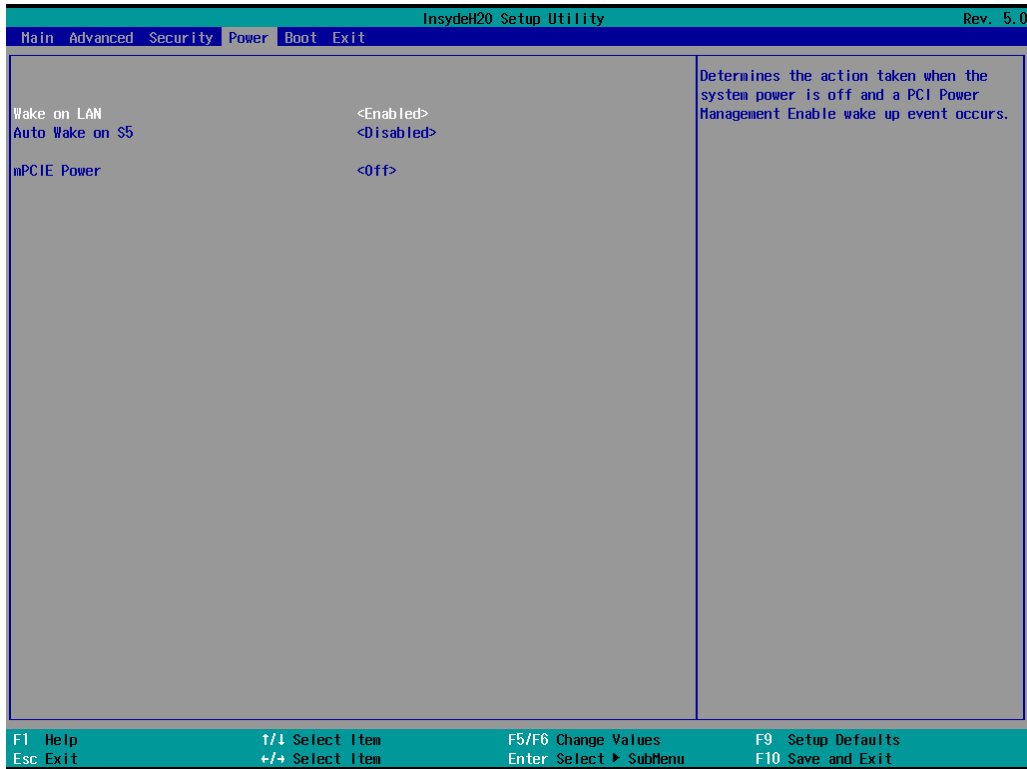
Enable: System will ask for the password on post time

Disable: System will ask for the password to go to the setup utility

Config-Only: System will only ask for the password when you select the config (F2) option

Power Settings

This section allows users to configure power settings.



Wake on LAN

This feature is used to wake the system by a LAN device from a remote host.

Options: Enabled (default), Disabled

Auto Wake on S5

This item allows you to configure the computer to wake from S5 status. S5 stands for Soft Off, where the PSU remains engaged but power to all other parts of the system is cut. Auto-wake on S5 schedules a soft-reboot at certain periodic times that may be specified in the BIOS.

Options: Disabled (default); By Every Day (user specifies a regular daily time when the computer will power up); By Day of Month (user specifies a regular day each month when the computer will power up)

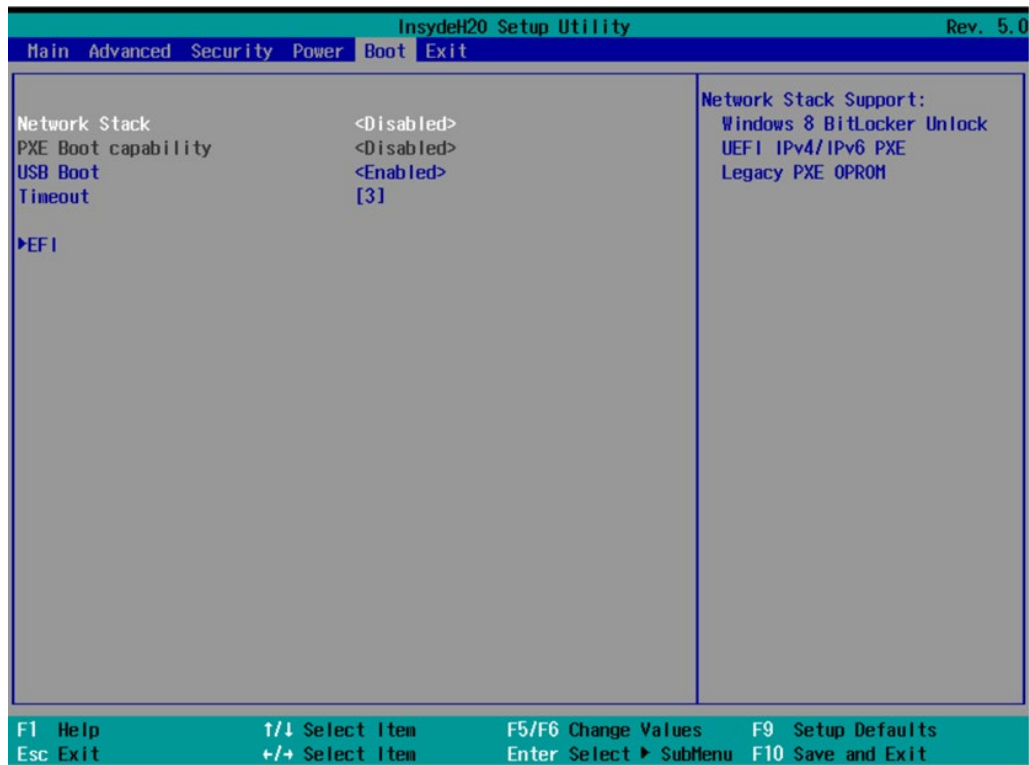
mPCIe Power

This item allows you to control the default power of the mini PCIE slot.

Options: Off (default), On

Boot Settings

This section allows users to configure boot settings.



NOTE

If you do not add any storage, you will not see the EFI option.

Network Stack

It deploys an Internet Protocol (IP) stack. The IP stack provides an application library to open/close connections to remote devices and send/receive data between the remote devices.

Options: Disabled (default), Enabled

PXE Boot capability

This item will be shown only when you have enabled the Network Stack.

PXE Booting is booting a system over a network. This item allows users to start PXE over IPv4 or IPv6

Options: Disabled (default), UEFI: IPv4, UEFI: IPv6, UEFI: IPv4/IPv6

USB Boot

Set booting to USB boot devices capability.

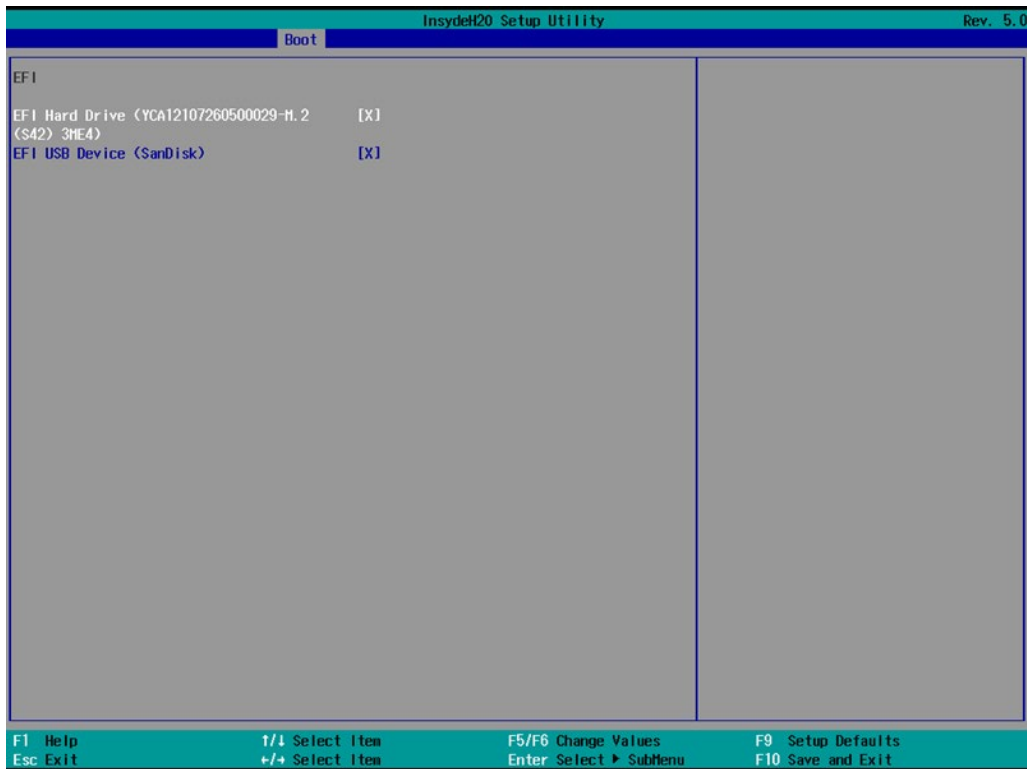
Options: Enabled (Default), Disabled

Timeout

This item allows users to set the number of seconds that the firmware will wait before booting from the default boot selection.

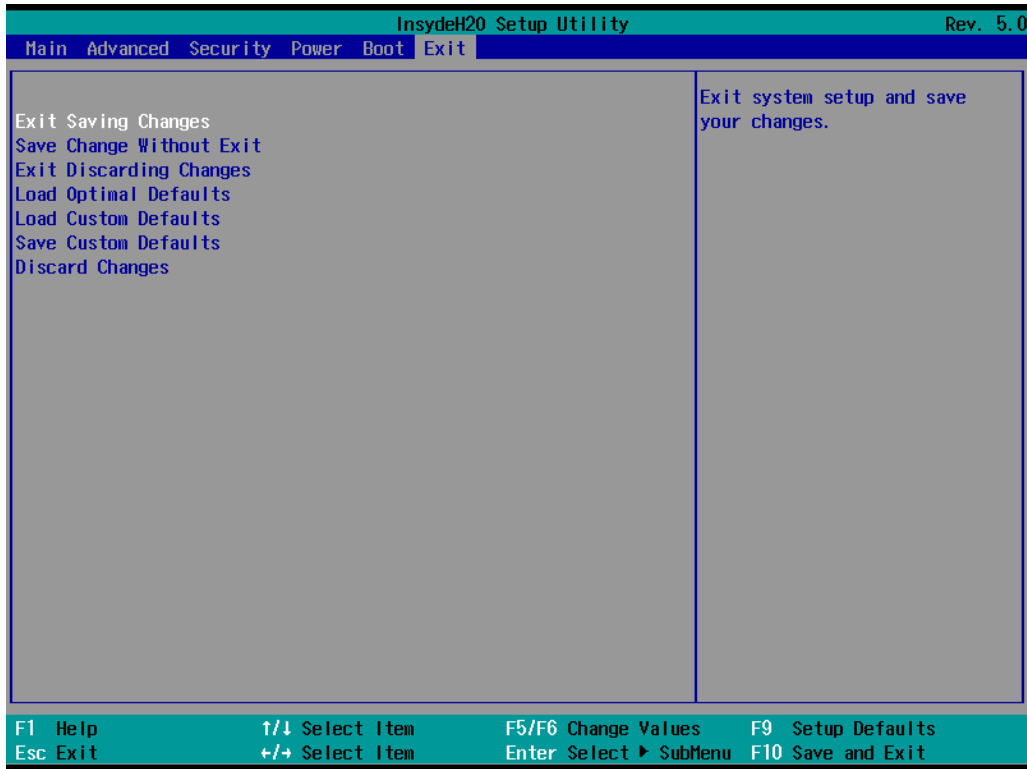
EFI

This item allows users to select the boot order. Use F5 (move down) or F6 (move up) to change the boot order.



Exit Settings

The section allows users to exit the BIOS environment.



Exit Saving Changes

This item allows you to exit the BIOS environment and save the values you have just configured.

Options: Yes (default), No

Save Change Without Exit

This item allows you to save changes without exiting the BIOS environment.

Options: Yes (default), No

Exit Discarding Changes

This item allows you to exit without saving any changes that might have been made to the BIOS.

Options: Yes (default), No

Load Optimal Defaults

This item allows you to revert to the factory default BIOS values.

Options: Yes (default), No

Load Custom Defaults

This item allows you to load custom default values for the BIOS settings.

Options: Yes (default), No

Save Custom Defaults

This item allows you to save the current BIOS values as a "custom default" that may be reverted to at any time by the load custom defaults selection.

Options: Yes (default), No

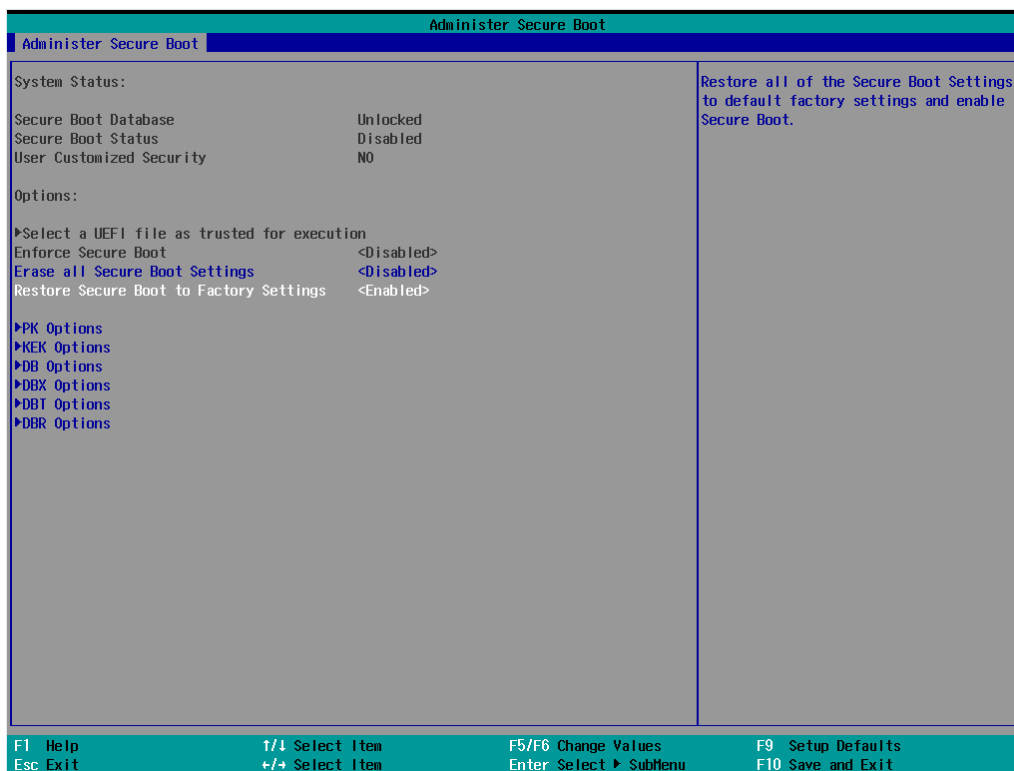
Discard Changes

This item allows you to discard all settings you have just configured.

Options: Yes (default), No

Administering Secure Boot

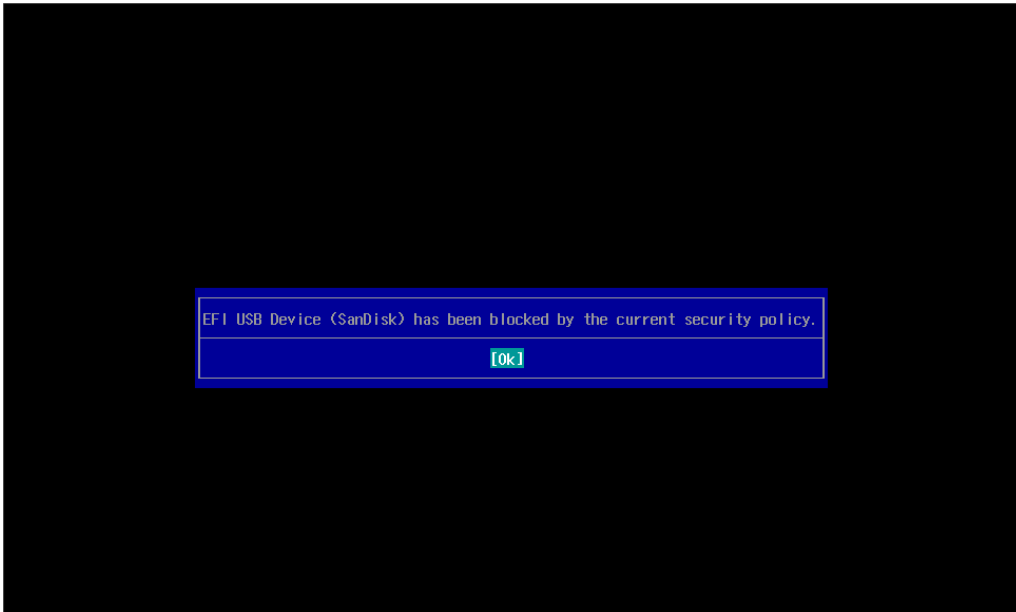
Press F2 to go to the Administer Secure Boot.



Secure Boot helps computers resist attacks and infection from malware. The feature defines an interface between the operating system and BIOS. It detects tampering with boot loaders, key operation system files, and unauthorized option ROMs by validating their digital signatures.

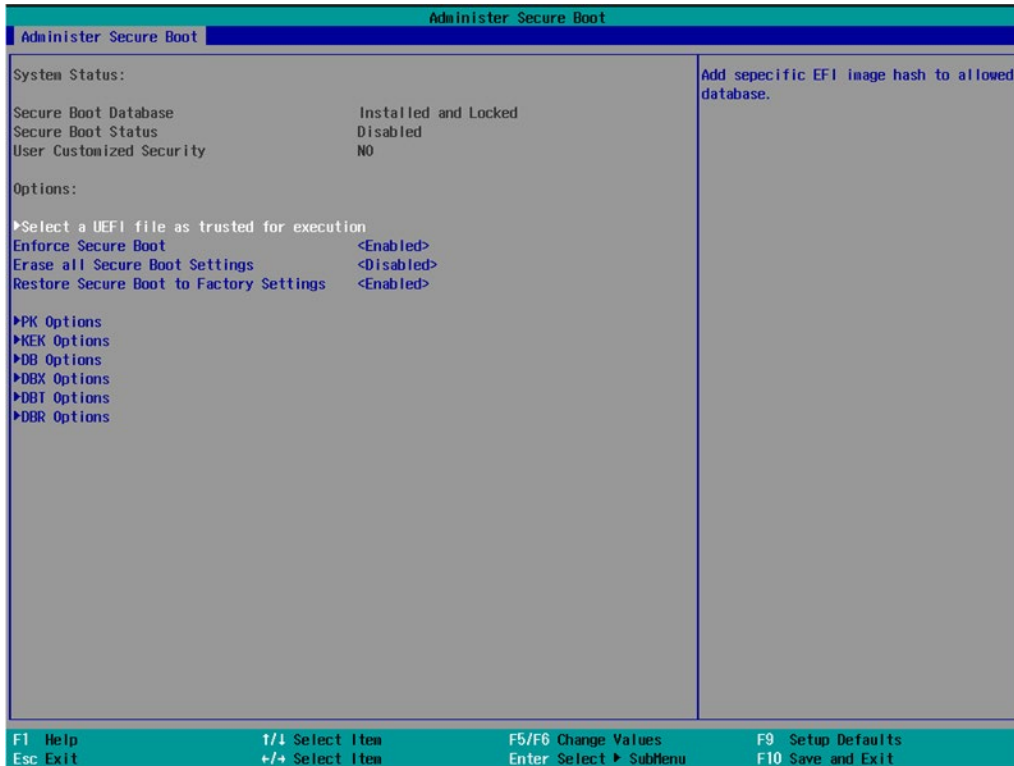
Enabling UEFI Secure Boot

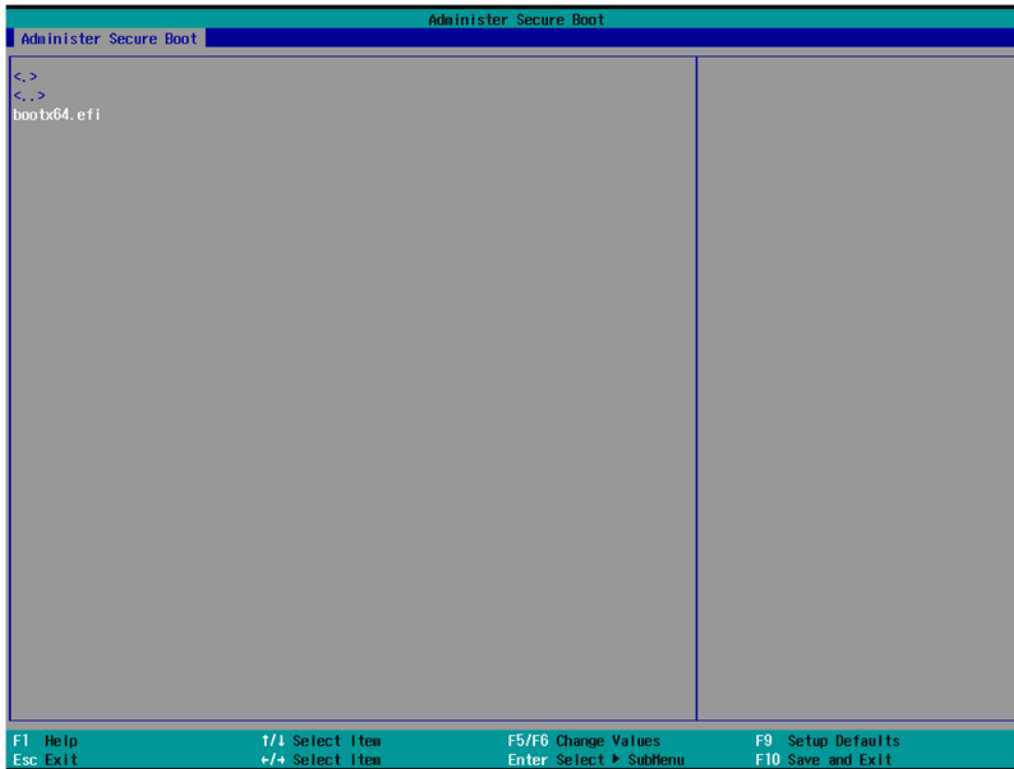
Set as "enabled" in "Restore Secure Boot to Factory Settings" under Administer Secure Boot menu. Press F10 as save and exist.



Moxa has included the Microsoft key in the BIOS by default. If you cannot boot up the computer using a non-Windows OS, use the following examples.

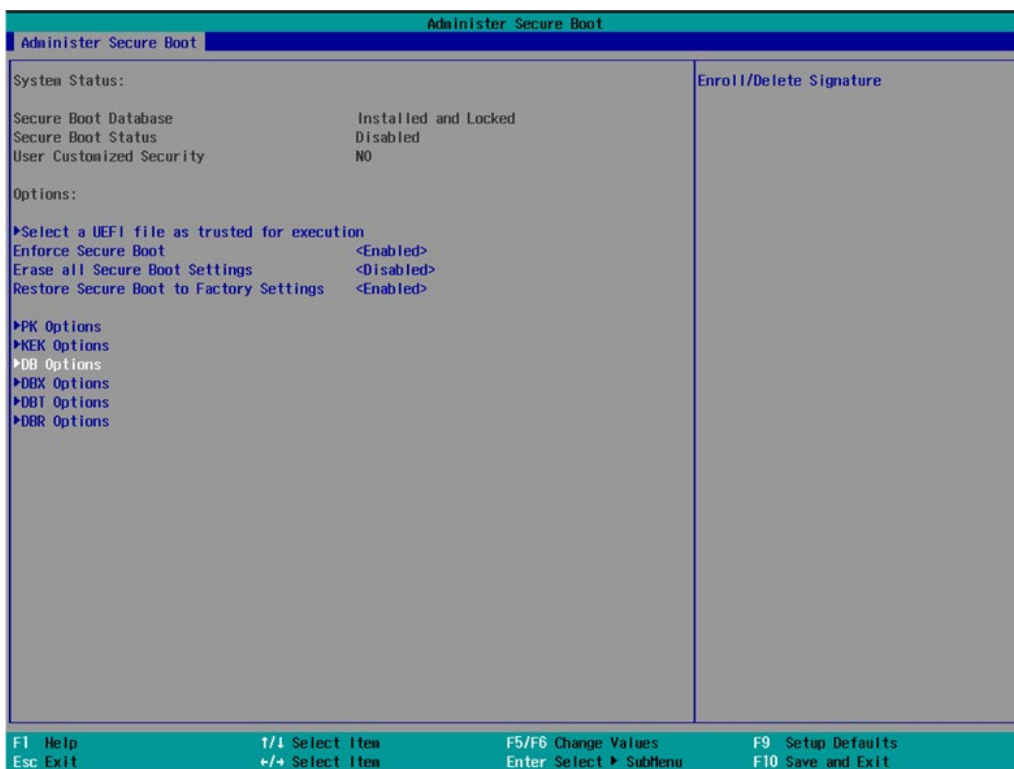
Enroll EFI Image

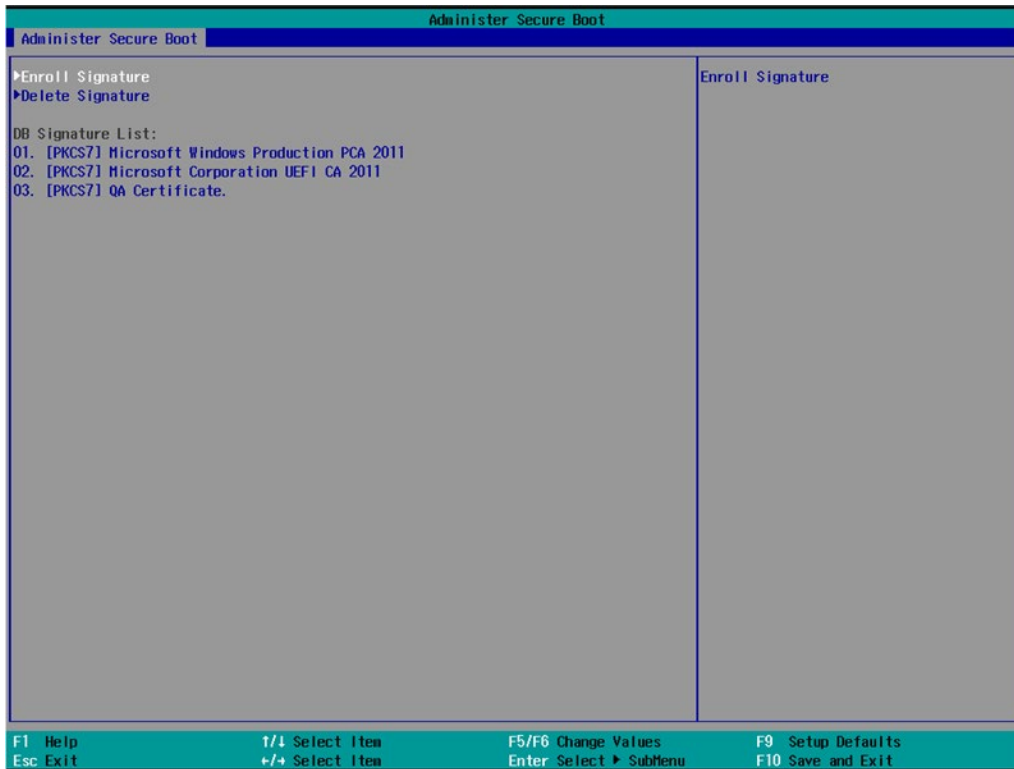




1. Enter **Administer Secure Boot** and select the option **Select a UEFI file as trusted for execution**.
2. Enter the loader name followed by the UEFI standard \EFI\BOOT\BOOT{machine type short-name}.
E.g., efi\boot\BootX64.efi, Debian (EFI\debian\grubx64.efi), Suse (EFI\opensuse\grubx64.efi)

Enroll Customer Key





Enter "DB OPTION" and enroll your key. Please make sure your key is CRT format and uses RSA 2048 or better.

Upgrading the BIOS

This section describes how to upgrade the BIOS on your computer.



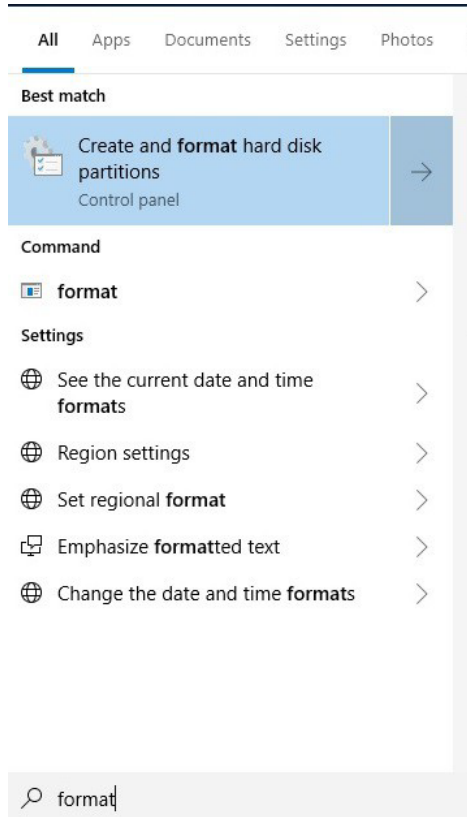
NOTE

It is possible to permanently damage the computer when upgrading the BIOS. We strongly recommend that you contact Moxa's technical support staff for assistance to obtain all the necessary tools and the most current advice before attempting to upgrade the BIOS on any Moxa device.

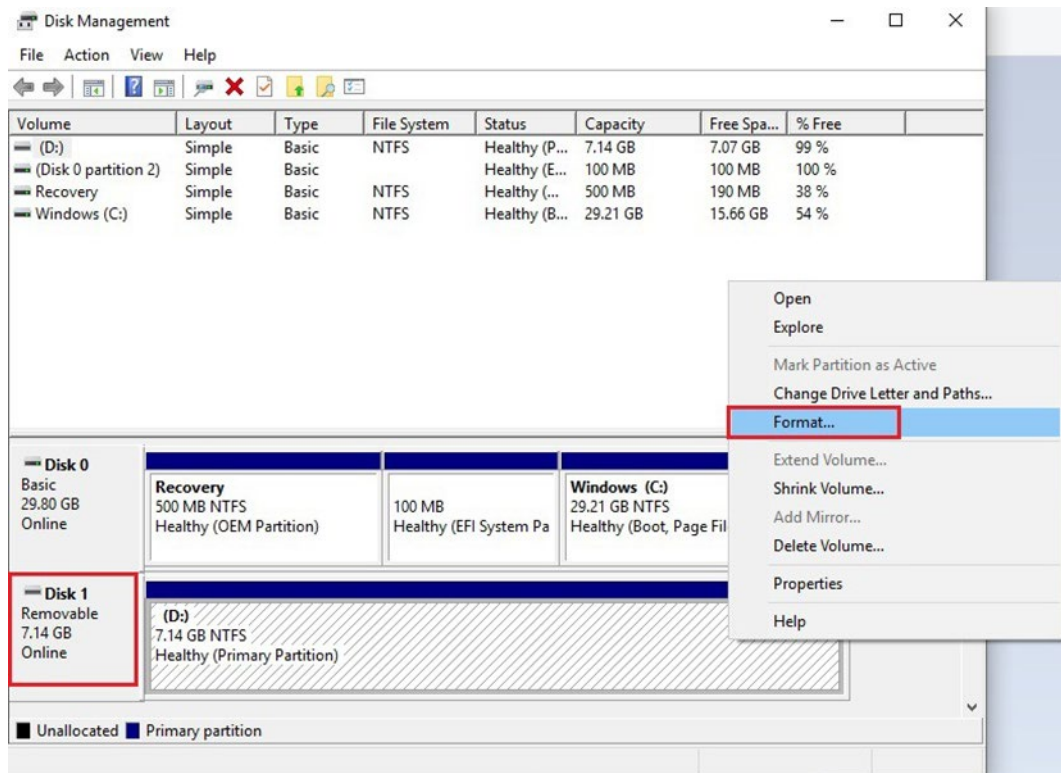
Step 1: Create a Bootable USB Disk

Before upgrading the BIOS, you must create a bootable USB drive as a system boot device for use in the future.

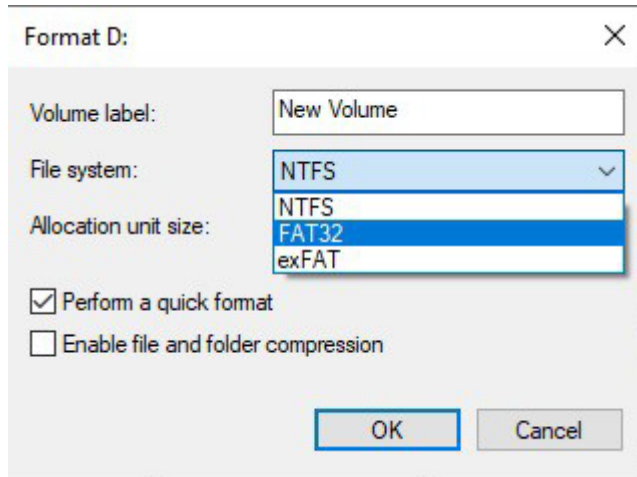
1. Insert a USB disk in the computer's USB drive.
2. Search for "format" and select **Create and format hard disk partitions**.



3. Right-click on the USB disk item and select **Format**.



4. Select **FAT32** and click **OK** to start formatting the disk.

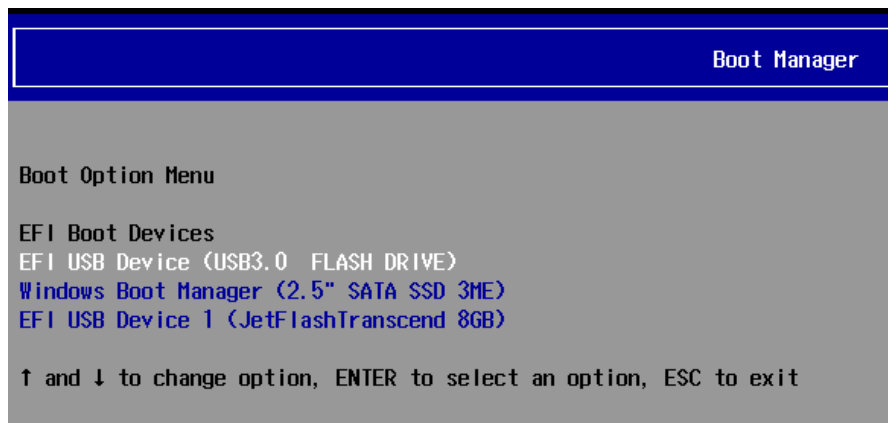


Step 2: Prepare the Upgrade File

You must use the BIOS upgrade installation file to upgrade the BIOS. Contact Moxa's technical department for assistance. The BIOS upgrade file includes an **efi** folder and an **xxxx.efi** file. Copy the **efi** folder and **xxxx.efi** file to the bootable USB disk.

Step 3: Run the Upgrade Program on Your Computer

1. Reboot the computer with the boot disk and press F2 to go to the Boot Manager.
If the BIOS cannot recognize the USB drive as the boot-up device, the USB drive might not have a partition table. Use the Windows command line tool **diskpart** to rebuild the partition table.
2. Select the USB Disk.



The screen will switch to the SHELL environment.

3. Type **fs0:**, go to the directory where the upgrade file is located, and type **xxxxxx.efi** (the file name is based on the upgrade file from Moxa).

```
Device mapping table
fs0      :Removable HardDisk - Alias hd24s0b blk0
         :PciRoot(0x0)/Pci(0x14, 0x0)/USB(0x12, 0x0)/HD(1, MBR, 0x00DD3D80, 0x3F, 0xEB5FC1)
blk0    :Removable HardDisk - Alias hd24s0b fs0
         :PciRoot(0x0)/Pci(0x14, 0x0)/USB(0x12, 0x0)/HD(1, MBR, 0x00DD3D80, 0x3F, 0xEB5FC1)
blk1    :Removable BlockDevice - Alias (null)
         :PciRoot(0x0)/Pci(0x14, 0x0)/USB(0x12, 0x0)
hd24s0b :Removable HardDisk - Alias fs0 blk0
         :PciRoot(0x0)/Pci(0x14, 0x0)/USB(0x12, 0x0)/HD(1, MBR, 0x00DD3D80, 0x3F, 0xEB5FC1)

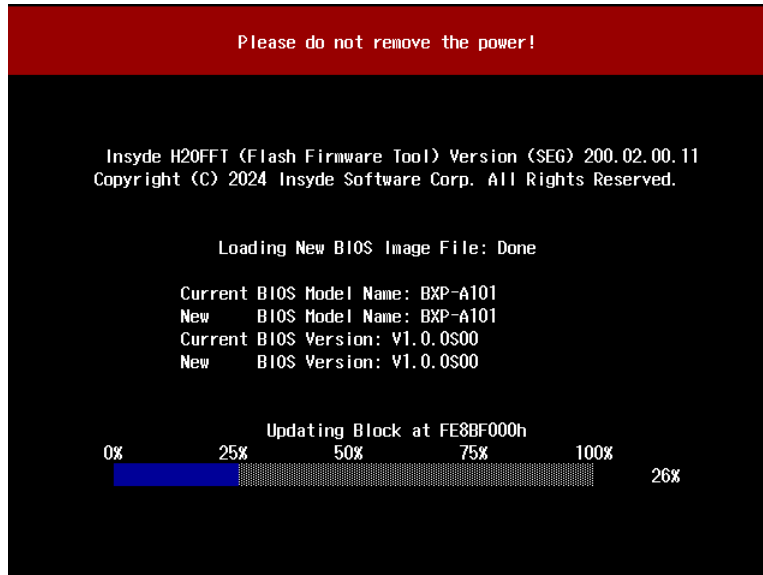
Shell> fs0:
fs0:\> xxxxxxx.efi
```

- Wait until the upgrade procedure is completed.



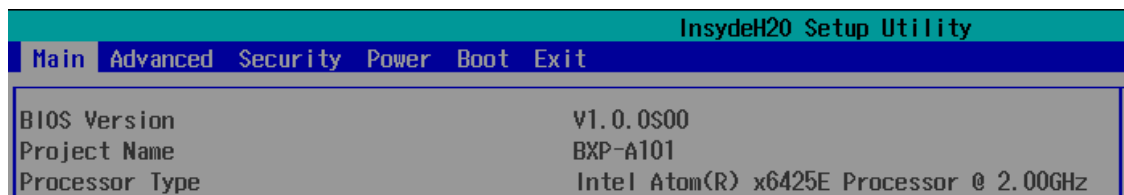
ATTENTION

Do NOT switch off the power supply during the BIOS upgrade, since doing so may cause the system to crash.

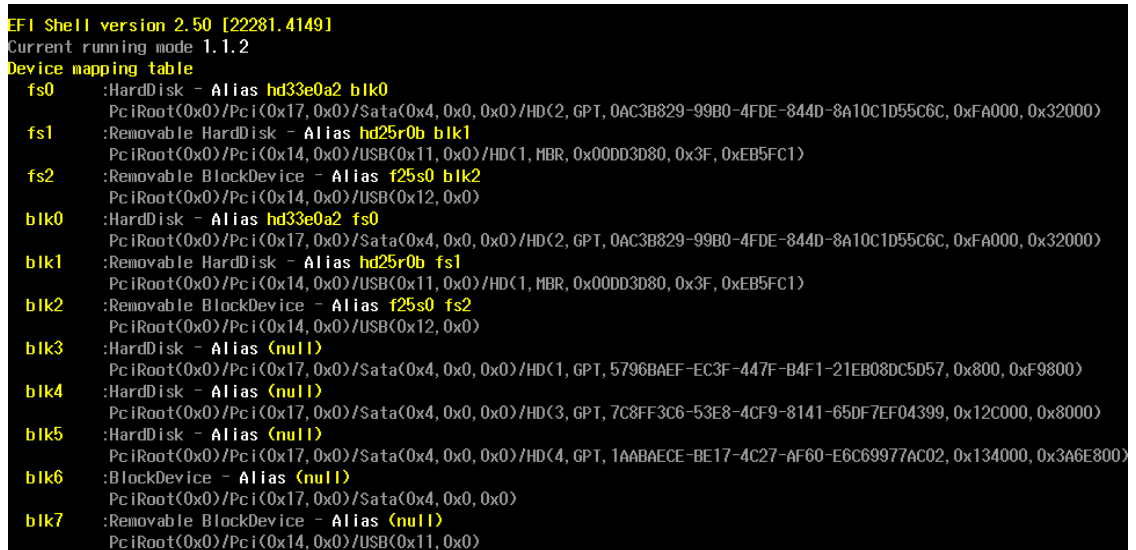


When the upgrade is finished, the computer will automatically reboot.

You can check the BIOS version on the Main page to confirm the upgrade.



If the system has more than one boot device, you will see more than one fsx (x represents the number).



5. Go to each fsx (x stands for the number) and type ls to view the content of the boot device. If you find an upgrade file, run it.

```
fs0:\> fs1:
fs1:\> ls
Directory of: fs1:\
06/27/19 11:43a <DIR>          16,384 efi
06/13/19 11:10a                17,974,704 820C100S16 efi
1 File(s) 17,974,704 bytes
1 Dir(s)
```


A. Regulatory Approval Statement



This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Class A: FCC Warning! This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.



European Community

Warning:

This is a class A product. If used in a domestic environment, this product may cause undesirable radio interference, in which case the user may be required to take adequate measures to prevent the interference from affecting nearby devices.